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CR-137276

CENSUS CITIES EXPERIMENT IN URBAN CHANGE DETECTION

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(E74-10417) CENSUS CITIES EXPERIMENT IN
URBAN CHANGE DETECTION Progress Report,
1 Jul. - 31 Dec. 1973 (Geological
Survey, Reston, Va.) 7 p HC \$4.00

N74-19951

Unclas
00417

CSCI 08B G3/13

1 March 1974

Type II Progress Report for Period 1 July 1973 - 31 December 1973

Prepared for:

Goddard Space Flight Center
Greenbelt, Maryland 20771

Publication authorized by the Director, U.S. Geological Survey

1. Report No.		2. Government Accession No.		3. Recipient's Catalog No.	
4. Title and Subtitle Census Cities Experiment in Urban Change Detection (SR-273)				5. Report Date 1 March 1974	
				6. Performing Organization Code	
7. Author(s) Valerie A. Milazzo (IN-084)				8. Performing Organization Report No.	
9. Performing Organization Name and Address U.S. Geological Survey Geographic Applications Program National Center, Mail Stop 115 Reston, Virginia 22092				10. Work Unit No.	
				11. Contract or Grant No. S-70243-AG	
12. Sponsoring Agency Name and Address Mr. Fred Gordon Goddard Space Flight Center Greenbelt, Maryland 20771				13. Type of Report and Period Covered Type II Progress Report 1 July 1973 - 31 Dec. 1973	
				14. Sponsoring Agency Code	
15. Supplementary Notes					
16. Abstract This report summarizes the progress and related aspects of ERTS Proposal 273 during the period between 1 July 1973 and 31 December 1973. Some of the more significant items are listed below. Mapping of 1970 and 1972 land use from high-flight photography has been completed for all test sites: San Francisco, Washington, Phoenix, Tucson, Boston, New Haven, Cedar Rapids, and Pontiac. Area analysis of 1970 and 1972 land use has been completed for each of the mandatory urban areas. All 44 sections of the 1970 land use maps of the San Francisco test site have been officially released through USGS Open File at 1:62,500. Five thousand copies of the Washington one-sheet color 1970 land use map, census tract map, and point and line identification map are being printed by USGS Publications Division ERTS imagery for each of the eight test sites is being received and analyzed. Color infrared photo enlargements at 1:100,000 of ERTS-1 MSS images of Phoenix taken on October 16, 1972 and May 2, 1973 are being analyzed to determine to what level land use and land use changes can be identified and to what extent the ERTS imagery can be used in updating the 1970 aircraft photo-derived land use data base. Work is proceeding on the analysis of ERTS imagery by computer manipulation of ERTS MSS data in digital format. ERTS CCT maps at 1:24,000 are being analyzed for two dates over Washington and Phoenix. Anniversary tape					
17. Key Words Suggested by Author URBAN LAND USE CHANGE DETECTION CENSUS			18. Distribution Statement		
19. Security Classif. (of this report) Unclassified		20. Security Classif. (of this page) Not applicable		21. No. of Pages 7	
				22. Price .	

Figure 2A. Technical Report Standard Title Page. This page provides the data elements required by DoD Form DD-1473, HEW Form OE-6000 (ERIC), and similar forms.

Type II Progress Report

ERTS-1

1 July 1973 - 31 December 1973

a. TITLE: Census Cities Experiment in Urban Change Detection. (ERTS-A Proposal No.: SR-273).

b. GSFC ID No.: IN-084

c. Statement and explanation of impedance:

There have been no further difficulties since those noted in the past reporting periods; all problems mentioned previously, for the most part, have since been corrected.

d. Accomplishments during the reporting period and those planned for the next period:

Mapping of 1970 land use and 1970-1972 land use changes from NASA high-flight photography has been completed for all test sites: San Francisco, Washington, Phoenix, Tucson, Boston, New Haven, Cedar Rapids, and Pontiac. Area analysis of 1970 and 1972 land use has been completed for each of the mandatory urban areas. All 44 sections of the 1970 land use maps of the San Francisco test site have been officially released through USGS Open File at 1:62,500. Five thousand copies of the Washington one-sheet color 1970 land use map, census tract map, and point and line identification map are being printed by USGS Publications Division.

A contract with the Dartmouth College Project in Remote Sensing to do land use change analysis from 1972 high-altitude aircraft and ERTS imagery for the Boston and New Haven test sites has been completed satisfactorily. A set of computer-generated maps of 1970 and 1972 land use have been provided for each of the test sites.

Work continues to progress on the statistical analysis of land use area data for Washington, D. C. and other cities as part of the contract with the Association of American Geographers to develop an urban spatial growth model. In addition, work under this contract includes the preparation of a Procedure Manual. The manual will serve as a text, or do-it-yourself "cookbook", for inventorying and summarizing land use, and land use change, from remotely sensed imagery, chiefly from high-altitude aerial photography, as well as conventional sources.

e. Scientific results and practical applications (Category 2E):

Analysis is continuing upon the data base generated from the 1970 and 1972 land use work. ERTS imagery for each of the eight test sites is being received and analyzed. Color infrared photo enlargements at 1:100,000 of ERTS-1 MSS images of Phoenix taken of October 16, 1972 and May 2, 1973 are being analyzed to determine to what level land use and land use changes can be identified. Modified Level II land use categories are being mapped for a 20 x 20 km sample area from the October 1972 ERTS images. This land use map is then compared with land use visible on the corresponding May 1973 scene to identify changes occurring within the half-year time interval. In addition, the ERTS imagery is being compared with the land use data base, generated as part of the Census Cities ERTS Experiment, for the same 20 km² area derived from 1970 high-altitude aircraft photography to evaluate comparability between the ERTS and photo-derived land use maps and to determine to what extent ERTS imagery can be used in updating the 1970 land use data base.

Work is proceeding in leaps and bounds on the analysis of ERTS imagery by computer manipulation of ERTS MSS data in digital format. Ellefsen and Gaydos at San Jose are analyzing ERTS CCT maps at 1:24,000 for two dates over Washington and Phoenix. Meanwhile, Swain at Purdue LARS is processing the balance of anniversary pairs of tapes over two additional test sites: Cedar Rapids and New Haven. Anniversary tape sets have arrived for some additional urban test sites.

f. Published reports or talks:

Ellefsen, Swain, and Wray presented a paper entitled "Urban Land-Use Mapping by Machine Processing of ERTS-1 Multispectral Data," at LARS in October. Ellefsen presented a follow-on paper at ARETS Symposium, Tucson, in November. Wray reported on the ERTS-1 Census Cities experiment and related use of ERTS-1 CCTs for land use mapping at NASA's Third ERTS Symposium, Washington, December 10-14. The presentation was carried to Alameda on December 12, Menlo Park on December 13, and Sacramento on December 14.

From February 11 to 22, Anderson and Wray will assist at NASA Goddard in evaluating 128 ERTS-B proposals dealing with land use. Milazzo prepared a joint paper with Kenneth Foster and Lay Gibson (University of Arizona) on aspects of the Census Cities work in Tucson for the Fourth Annual Conference on Remote Sensing of Arid Lands held in Tucson, Arizona, November 14-16, 1973. Milazzo will also present papers comparing aspects of ERTS and Skylab for urban studies at AGU and Ann Arbor meetings in April.

Additional meetings attended during the reporting period included the following: Bicentennial Commission, USGS Urban Studies Program, Appalachian Regional Commission, LARS/Purdue, Urban and Regional Information Systems Association. Milazzo visited General Electric Company facilities at Daytona Beach to learn how the GE Image 100 System can help to classify land use from ERTS spectral data in digital format.

Talks and papers were presented at LARS, Purdue; American Society of Photogrammetry, Sioux Falls; and National Council on Geographic Education, Washington.

g. Recommendations for improvement:

None.

h. Changes in standing order forms:

Computer compatible tapes for selected additional ERTS frames have been ordered and received.

sets have been received at Purdue LARS for some additional urban test sites. Anniversary pairs of tapes over Cedar Rapids and New Haven are in processing.